

**FACT SHEET FOR NPDES PERMIT WA-000076-1**  
**TESORO REFINING and MARKETING**  
**SUMMARY**

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## INTRODUCTION

The Federal Clean Water Act (FCWA, 1972, and later modifications, 1977, 1981, and 1987) established water quality goals for the navigable (surface) waters of the United States. One of the mechanisms for achieving the goals of the Clean Water Act is the National Pollutant Discharge Elimination System of permits (NPDES permits), which is administered by the Environmental Protection Agency (EPA). The EPA has authorized the State of Washington to administer the NPDES permit program. Chapter 90.48 RCW defines the Department of Ecology's authority and obligations in administering the wastewater discharge permit program.

The regulations adopted by the State include procedures for issuing permits (Chapter 173-220 WAC), water quality criteria for surface and ground waters (Chapters 173-201A and 200 WAC), and sediment management standards (Chapter 173-204 WAC). These regulations require that a permit be issued before discharge of wastewater to waters of the state is allowed. The regulations also establish the basis for effluent limitations and other requirements which are to be included in the permit. One of the requirements (WAC 173-220-060) for issuing a permit under the NPDES permit program is the preparation of a draft permit and an accompanying fact sheet. Public notice of the availability of the draft permit is required at least thirty days before the permit is issued (WAC 173-220-050). The fact sheet and draft permit are available for review (see [Appendix A--Public Involvement](#) of the fact sheet for more detail on the Public Notice procedures).

The fact sheet and draft permit have been reviewed by the Permittee. Errors and omissions identified in this review have been corrected before going to public notice. After the public comment period has closed, the Department will summarize the substantive comments and the response to each comment. The summary and response to comments will become part of the file on the permit and parties submitting comments will receive a copy of the Department's response. The fact sheet will not be revised. Comments and the resultant changes to the permit will be summarized in Appendix D--Response to Comments.

## GENERAL INFORMATION

<u>Applicant:</u>	Tesoro Refining and Marketing Company	<u>Outfall 001:</u>	Latitude: 48° 30' 30"N. Longitude: 122° 34' 00" W.
		<u>Outfall 002:</u>	Latitude: 48° 29' 30" N. Longitude: 122° 34' 00" W.
		<u>Outfall 003:</u>	Latitude: 48°30' 00" N Longitude: 122°33' 41" W
		<u>Outfall 004:</u>	Latitude: 48°29' 25" N Longitude: 122°34' 30" W
<u>Facility Name and Address:</u>	Tesoro Refining and Marketing Company West March Point Road PO Box 700 Anacortes, Washington 98221	<u>Water Body ID Number:</u>	WA - 03 - 0020
<u>Type of Facility:</u>	Petroleum Refinery	<u>Discharge Location:</u>	Fidalgo Bay

## **BACKGROUND INFORMATION**

The refinery is located on the northwestern coast of Washington on March Point, which extends into Fidalgo Bay to the west and Padilla Bay to the east. The facility is located in Skagit County, approximately two miles east/southeast of the town of Anacortes, Washington.

**Industrial Process** - The refinery was originally constructed in 1955. In 1965, the refinery processed 68,000 barrels (bbl) of crude oil per day. The facility currently processes 105,000 to 115,000 bbl/stream day of crude oil. The main source of crude oil during the last five years has been Alaskan Northern Slope Crude via tankers and Canadian Crude via pipeline. Canadian crude has been the source for the past several years. The refinery separates crude oil into its various component parts then further processes and blends them into a variety of petroleum products. Those products include gasoline, turbine and jet fuel, diesel oil, liquid petroleum gas, and residual fuel oil. The refinery directly employs about 330 people, and estimates indirect employment at 280 jobs.

**Wastewater System** – Sanitary wastewater (sewage) is collected in a septic tank where solids are separated from liquids. Effluent from the septic tank discharges into a neutralization pit. Chemical wastewater (spent process acid – pH range 2-4) is added to the pit once or twice a day in a batch process. Fecal coliform bacteria and other microorganisms in the septic tank effluent are killed in the neutralization pit by the low pH. The neutralization pit discharges to the API separator (head end of the industrial wastewater treatment system) where the low pH discharge mixes with process wastewater (pH range 10 – 12). Mixing of these two wastewater streams is controlled to maintain a pH range of 5.5 – 9.5.

Tesoro's industrial wastewater receives primary and secondary treatment in a system consisting of parallel API oil/water separators, primary clarifiers, activated sludge units, secondary clarifiers, and two final holding ponds. The total discharge volume generally ranges from 2.0 to 6.0 million gallons per day. The highest daily discharge in the data reviewed was 12.2 million gallons per day recorded in January of 1991. The discharge is generally pumped into Fidalgo Bay between 10:00 hours and 16:00 hours. Other potential discharge points, Outfall 002, Outfall 003 and Outfall 004, occasionally discharge during high rainfall events. It is described later in the fact sheet in the stormwater/emergency overflow section.

**Discharge** - All of Tesoro's process water, sanitary wastewater, stormwater, and ballast water discharges via a 30-inch multi-port submerged diffuser at Outfall 001. The refinery's wastewater outfall is supported on the Tesoro shipping pier and extends approximately 3400 feet from the shore, in a north/northwesterly direction, into Fidalgo Bay. Tesoro uses Outfall (002) only during extreme storm events.

PERMIT STATUS

Ecology issued the existing permit for this facility on March 23 1998. The limitations were based on three feedstock rates or tiers. The previous permit placed effluent limitations on the following parameters tabulated below.

*Effluent Limitations for the Previous Permit*

Parameter	Units	Tier 1 – 100,000 bbls/day		Tier 2 – 110,000 bbls/day		Tier 3 – 120,000 bbls/day	
		Average Monthly <sup>a</sup>	Maximum Daily <sup>b</sup>	Average Monthly <sup>a</sup>	Maximum Daily <sup>b</sup>	Average Monthly <sup>a</sup>	Maximum Daily <sup>b</sup>
Biochemical Oxygen Demand (5-day)	lbs/day	650	1180	690	1260	730	1340
Chemical Oxygen Demand	lbs/day	4520	8750	4800	9300	5080	9860
Total Suspended Solids	lbs/day	520	820	560	870	590	930
Oil and Grease	lbs/day	190	360	200	380	220	400
Oil and Grease	mg/l	The concentration of oil and grease in the discharge shall at no time exceed 15 mg/l and shall not exceed 10 mg/l more than three days per month.					
Phenolic Compounds	lbs/day	4.3	8.8	4.5	9.3	4.8	9.9
Ammonia as N	lbs/day	400	890	440	970	480	1060
Sulfide	lbs/day	3.5	7.7	3.7	8.2	3.9	8.7
Total Chromium	lbs/day	6.7	17.3	7.4	18.5	8.1	19.6
Hexavalent Chromium	lbs/day	0.5	1.2	0.6	1.3	0.6	1.4
Fecal Coliforms	Organisms/ ml	200/100 mls average monthly limit, 400/100 mls maximum daily					
pH	pH shall be maintained within the range of 6.0 to 9.0. Excursions between 5.0 and 6.0, or 9.0 and 10.0 shall not be considered violations provided no single excursion exceeds 60 minutes in length and total excursions do not exceed 7 hours and 30 minutes per month. Any excursions below 5.0 and above 10.0 are violations. The instantaneous maximum and minimum pH shall be reported monthly. In the event of a failure of continuous monitoring equipment hourly grab samples shall meet the frequency requirements.						

Total Residual Chlorine	<b>Technology Based Limits 0.5 mg/l monthly average; 1.0 mg/l daily maximum</b> <b>Water Quality Based Limits 0.1 mg/l monthly average; 0.26 mg/l daily maximum</b> <b>Water quality based limits will be effective on November 1, 1999.</b> Total residual chlorine monitoring is required to be monitored on a daily basis during those times when the effluent is being actively chlorinated. Monitoring will also be required for two additional days following cessation of chlorination.
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<sup>a</sup> The average monthly effluent limitation is defined as the highest allowable average of daily discharges over a calendar month, calculated as the sum of all daily discharges measured during a calendar month divided by the number of daily discharges measured during that month. Additional allocation may be permitted for stormwater runoff and ballast water according to Permit Condition S1.C.

<sup>b</sup> The maximum daily effluent limitation is defined as the highest allowable daily discharge. The daily discharge means the discharge of a pollutant measured during a calendar day. For pollutants with limitations expressed in units of mass, the daily discharge is calculated as the total mass of the pollutant discharged over the day. For other units of measurement, the daily discharge is the average measurement of the pollutant over the day. Additional allocation may be permitted for stormwater runoff and ballast water according to Permit Condition S1.C.

Tesoro submitted an application for permit renewal to the Department in October 2002. Additional information was submitted to Ecology in 2003 and 2004 and was accepted by the Department shortly thereafter.

#### *SUMMARY OF COMPLIANCE WITH THE PREVIOUS PERMIT*

Ecology conducted the most recent compliance inspection, including sampling, on April 26-27 2005.

Tesoro reported chlorine residual limits exceedances on one day in each month of August and September 1998. The maximum daily TSS limit was exceeded on September 18, 2000. High BOD concentrations (69.3 mg/l) for 10 November 2004 resulted in total mass discharge for the day to exceed the permitted level.

The permit required submittal of various reports. These included Human Health Study, Dioxin Study, Treatment System Efficiency Study, Water Quality Pollution Prevention Plan, Sediment Monitoring, Acute and Chronic Toxicity Monitoring. These reports were submitted to the Department as required. Ecology used the data from these reports to prepare this permit.

#### *WASTEWATER CHARACTERIZATION*

The proposed wastewater discharge is characterized for the following regulated parameters:

#### **Wastewater Characterization**

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The following data comes from the current permit renewal application (revision 2) submitted October 2004, and from report submittals required by the permit.

MAXIMUM DAILY VALUES OF POLLUTANTS		
PARAMETER	CONCENTRATION	MASS
BOD	19.7 mg/l	554 lb/day
COD	124 mg/l	3440 lb/day
TSS	44 mg/l	1197 lb/day
Ammonia	5 mg/l	129 lb/day
Flow	8 MGD	
Temperature (winter)	23°C	
Temperature (summer)	30 °C	
pH	6.2 minimum/8.6 maximum	
Fecal coliforms	500 organisms/100ml	
Nitrate	.2 mg/l	4.7 lb/day
Nitrogen (Total Organic)	<1.0 mg/l	<24 lb/day
Oil and Grease	11 mg/l	218 lb/day
Phosphorous	.1 mg/l	2.4 lb/day
Sulfate	170 mg/l	4000 lb/day
Sulfide	.03 mg/l	0.87 lb/day
Surfactants	.20 mg/l	4.7 lb/day
Antimony	0.102 mg/l	2.5 lb/day
Chromium (Total)	.002 mg/l	0.05 lb/day
Copper	.006 mg/l	0.15 lb/day
Lead	.002 mg/l	.05 lb/day
Mercury	0.007 mg/l	0.18 lb/day
Selenium	.022 mg/l	0.55 lbs/day
Silver	<.0005 mg/l	<0.01 lbs/day
Zinc	.053 mg/l	1.31 lb/day
Cyanide	.039 mg/l	1 lb/day



MAXIMUM DAILY VALUES OF POLLUTANTS		
Phenols	.040 mg/l	1.376 lb/day
Chloroform	.0064 mg/l	0.15 lb/day

### **PROPOSED PERMIT LIMITATIONS**

Effluent limitations set forth in a NPDES permit must be either technology- or water quality-based as required by state and federal regulations. Technology-based limitations are based upon the treatment methods available to treat specific pollutants. Technology-based limitations are set by regulation or developed on a case-by-case basis (40 CFR 125.3, and Chapter 173-220 WAC). Water quality-based limitations are based upon compliance with the Surface Water Quality Standards (Chapter 173-201A WAC), Ground Water Standards (Chapter 173-200 WAC), Sediment Quality Standards (Chapter 173-204 WAC) or the National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992). The more stringent of these two limits must be chosen for each of the parameters of concern. Each of these types of limits is described in more detail below.

The limits in this permit are based in part on information received in the application. The effluent constituents in the application were evaluated on a technology- and water quality-basis. The limits necessary to meet the rules and regulations of the State of Washington were determined and included in this permit. Ecology does not develop effluent limits for all pollutants that may be reported on the application as present in the effluent. Some pollutants are not treatable at the concentrations reported, are not controllable at the source, are not listed in regulation, and do not have a reasonable potential to cause a water quality violation. Effluent limits are not always developed for pollutants that may be in the discharge but not reported as present in the application. In those circumstances the permit does not authorize discharge of the non-reported pollutants. Effluent discharge conditions may change from the conditions reported in the permit application. If significant changes occur in any constituent, as described in 40 CFR 122.42(a), the Permittee is required to notify the Department of Ecology. The Permittee may be in violation of the permit until the permit is modified to reflect additional discharge of pollutants.

### **DESIGN CRITERIA**

In accordance with WAC 173-220-150 (1)(g), flows or waste loadings shall not exceed approved design criteria.

The design criteria for this treatment facility are obtained from Tesoro correspondence dated January 4, 2005 and July 25, 2005 and the April 2000 engineering report prepared by Tesoro Northwest Co. and are as follows:

## **Design Standards.**

Flows or waste loadings of the following design criteria for the permitted treatment facility shall not be exceeded:

<b>Process Wastewater treatment plant capacity (excludes storm water)</b>	
Average monthly flow for the maximum month <sup>1</sup>	4.3 MGD
Average monthly COD for the maximum month <sup>2</sup>	1700 mg/l

<sup>1</sup> as measured at influent to treatment

<sup>2</sup> as measured at the primary clarifier

## **TECHNOLOGY-BASED EFFLUENT LIMITATIONS**

### **PROCESS WASTEWATER**

The Tesoro refinery effluent limitations in the proposed permit are based on Guidelines developed by the Environmental Protection Agency (EPA): Best Conventional Pollutant Control Technology (BCT), Best Available Technology Economically Achievable (BAT), Best Practicable Control Technology Currently Available (BPT), and New Source Performance Standards (NSPS). On April 17, 1984 the EPA and the Natural Resources Defense Council finalized a settlement agreement resolving litigation about the EPA guidelines for calculating specific limitations for the petroleum refining industry. Amended Federal Effluent Guidelines were published on August 12, 1985 (40 CFR Part 419) by the Environmental Protection Agency (EPA) for the cracking subcategory of petroleum refining. The amended guidelines established BCT and BAT as equal to BPT for all parameters except phenols and chromium, which are regulated by whichever federal guideline is most stringent. In addition, Ecology requires the Permittee to use all known, available, and reasonable methods to control toxicants (AKART) in the applicant's wastewater as required under Washington State regulations. Because Ecology has applied new source performance standards (NSPS) on the basis of our AKART requirements, the NPDES permit limitations applied have been more stringent than those in other states. We have applied these more stringent NSPS limits to all crude throughput increases since 1984.

On December 31st, 2003 EPA published their intention to review the petroleum refining industry to decide the necessity for revising their effluent guidelines. They evaluated pollution prevention opportunities, emerging treatment technologies, revising the effluent guidelines, and expanding the list of regulated pollutants. EPA reviewed information and comments on several issues including: control technologies for polycyclic aromatic hydrocarbons (PAHs), dioxin sources and reduction/control technologies, sources of toxic metals, process modifications to reduce metals, and what toxics are being released and remain unreported. On September 2, 2004 (Federal Register Volume 69 No. 170) EPA published their decision regarding revising the refinery effluent guidelines. EPA concluded that there is little evidence that PAHs are present in refinery wastewater discharges in concentrations above the detection limit. They also concluded that the concentration of metals being discharged by refineries is at or very near treatable levels, leaving little to no opportunity to reduce metals discharges through conventional end-of-pipe treatment. EPA reviewed the available dioxin information collected by refineries nationwide much of which was collected at the Washington state refineries. The overall data indicated that dioxins are only occasionally discharged in relatively low concentrations in treated refinery

effluent. In their opinion this data did not warrant the development of national categorical limitations on dioxin in refinery wastewater discharges. EPA did note that on a case-by-case, best professional judgment basis permit writers may decide to include effluent limitations for dioxin. They also encouraged permit writers and refineries to consider pollution prevention opportunities. As a result of their evaluation, EPA has concluded that there is not a significant need to revise the federal effluent guidelines at this time.

Where federal effluent guidelines are over 5 years old, Ecology's process is to review the EPA development document and compare the production processes, the pollutants generated, the treatment efficiencies and unit process design. This comparison allows Ecology to verify whether the effluent guidelines meet the intent of RCW 90.48.520 (AKART).

The permit issued in 1998 required Tesoro to conduct a treatment efficiency study to evaluate wastewater treatment system capacities and determine in an engineering report whether the treatment system was adequate to treat current and future wastewater flows. The 1998 permit also required a study to determine the levels of dioxin in the refinery discharge, in the API sludge, and in catalytic regeneration wastewater. To prepare this permit, Ecology reviewed the engineering report and study information provided by Tesoro along with the data and information that formed the basis for the existing federal effluent guidelines. Through this analysis, Ecology determined that the Tesoro refinery continues to apply AKART to their wastewater for all pollutants with the exception of dioxin. Therefore federal effluent guidelines were used to develop permit limits for conventional parameters. Tesoro is required by the proposed NPDES to prepare an AKART study to prevent dioxin and furan congeners from being discharged in the final effluent. The proposed permit includes a requirement that treatment system capacity be reevaluated at the end of the permit cycle to ensure that the facility will continue to provide all known, available, and reasonable methods to control toxicants (AKART) in their wastewater.

The feedstock rate stabilized over the last permit term. The rate changes in refinery processes are shown below along with the applicable size and process factors selected from the EPA guidelines. Ecology's size and process factor determination is documented in **Appendix F**. We multiplied these factors by the actual feed stock rate to obtain an adjusted feed stock rate that we used in determining effluent limitations (except for determining BAT limitations for phenols and chromium).

The following table lists the refinery processes, flows, process and size factors as calculated in **Appendix F**.

**FEEDSTOCK [BARRELS PER DAY]**

	1990 Permit	1998 Permit			Proposed Permit
		Tier 1	Tier 2	Tier 3	

*FACT SHEET FOR NPDES PERMIT WA-000076-1*

	1990 Permit	1998 Permit			Proposed Permit
		Tier 1	Tier 2	Tier 3	
Actual Feed Stock, bbls/day	85400*	100000	110000	120000	113600
Desalting, bbls /day	85400	106500	117100	127800	119600
Atmospheric Distillation, bbls/day	85400	100000	110000	120000	113600
Vacuum Distillation, bbls/day	34000	30900	34000	37100	42800
Fluid Catalytic Cracking, bbls/day	35900	40300	44300	48300	43300
Propane Deasphalting, bbls/day	15100	12500	13800	15000	14000
Hydrotreating, bbls/day	19000	63500	69900	76200	61000
H <sub>2</sub> SO <sub>4</sub> Alkylation, bbls/day	9000	11300	12400	13600	11300
Catalytic Reforming, bbls/day	15000	21100	23200	25300	23800

\* All feedstock rates specified in this table represent actual crude throughput less slop oil and other recycled material.

Increases in the feedstock rate are subject to limitations determined by Ecology to be the treatment level obtained from using all known available and reasonable treatment methods. Those increases are therefore subject to New Source Performance Standards. These limitations were calculated by multiplying the increase in Tesoro's adjusted feed stock rate by New Source Performance Standards (NSPS). Ecology then added the resulting NSPS increment BAT and BPT limitations, based upon the adjusted baseline feedstock rate (BCT limitations are equivalent to BPT limitations).

The EPA/NRDC settlement agreement provided separate factors for calculating phenols, total chromium, and hexavalent chromium for the BAT limitation. These calculations required rate data for additional processes including: hydrotreating, catalytic reforming, and alkylation. This information is included in the above table.

Federal effluent guidelines for total and hexavalent chromium were determined when chromium was commonly used in cooling water systems and discharged at much higher levels in the effluent. Since the EPA banned chromium from use in cooling systems, in the early 1990's, the only remaining source of chromium is that which is present in the crude oil. But because federal effluent guidelines still include a limits for chromium, we have included an effluent limit in the proposed permit. Based on the reduction of chromium in the effluent, to levels bordering on non-detectable, the guideline derived effluent limitation is artificially high. All detectable

samples of chromium in the Tesoro effluent have been within the range of 5 – 10 µg/l which is less than 1/10<sup>th</sup> the marine chronic water quality standard of 50 µg/l of Hex Cr (acute standard = 1100 µg/l). Approximately half of the sample results obtained during the past 5 years were non-detectable for chromium. Based on this information, Ecology decided that an alternative **hexavalent chromium concentration limit of 50 µg/l (the chronic marine standard)** is achievable, reasonable, and protective. The standard is more stringent than the federal effluent guidelines and it adequately replaces both the total chromium limit and hexavalent chromium limit in the permit.

In the event that chromium levels change in the crude oil refined at Tesoro and result in concentration increases, Ecology will modify the permit to increase the limit as necessary to allow continued facility compliance. Any revised limit will be evaluated to ensure that the effluent continues to meet water quality standards within the authorized mixing zone and to ensure it does not exceed limits that allowed under federal effluent guidelines. In the event that federal effluent guidelines are promulgated without chromium limitations, the limit will be dropped from the permit unless the situation changes and Ecology determines a water quality limit is necessary. Tesoro will continue semi-annual hexavalent chromium monitoring.

The permit limit calculations are tabulated in **Appendix F**. The actual permit limit is the most stringent of the BAT and BPT determinations. BPT limitations are more stringent for phenol and BAT limits are more stringent for chromium. The proposed effluent limitations are listed in the table below in pounds per day.

#### **PROPOSED EFFLUENT LIMITS**

<b>Parameter</b>	<b>Units</b>	<b>Limits</b>	
		<b>Average Monthly</b>	<b>Maximum Daily</b>
Biochemical Oxygen Demand (5-day)	lbs/day	710	1280
Chemical Oxygen Demand	lbs/day	4900	9500
Total Suspended Solids	lbs/day	560	890
Oil and Grease	lbs/day	210	380

Parameter	Units	Limits	
		Average Monthly	Maximum Daily
Oil and Grease	mg/l	The concentration of oil and grease in the discharge shall at no time exceed 15 mg/l, and shall not exceed 10 mg/l more than three days per month.	
Phenolic Compounds	lbs/day	4.6	9.5
Ammonia as N	lbs/day	450	1010
Sulfide	lbs/day	3.8	8.4
Hexavalent Chromium	mg/l	--	0.050
Fecal Coliforms	organisms/ 100mls	200/100 mls average monthly limit, 400/100 mls maximum daily	

#### BALLAST AND STORMWATER ALLOCATIONS

Tesoro discharges contaminated stormwater from the process area to the oily water sewer which conveys it to the wastewater treatment facility. Stormwater runoff generated from the wastewater treatment facility ordinarily is discharged to the stormwater flume but it can be diverted and treated if necessary. Tesoro collects stormwater from the tank farms and the rest of the industrial site and discharges it into stormwater flume adjacent to the west retention pond on the treatment plant site. Some settling occurs in this pond and oil and grease can be skimmed from the surface as necessary. Tesoro then discharges stormwater into the west retention pond where it is commingled with the treated process wastewater prior to final discharge. Tesoro occasionally discharges petroleum contaminated ballast water into the process wastewater treatment system.

Flow measurement devices are not available to directly measure stormwater volume. Direct measurement would be difficult since a portion of the stormwater is diverted into the oily water sewer at many collection points, and a portion of the stormwater is collected in the stormwater system. The stormwater flow is calculated by subtracting an estimated dry weather flow from the total flow discharged each day. The dry weather flow estimate is tied to the feedstock rate.

Dry weather flow for current conditions was estimated by evaluating total flow during dry weather time periods at the facility. This estimate was determined to be 2.7 MGD

The ballast and stormwater allocations in the permit are based on federal effluent guidelines published in 40 CFR 419.12(c) and 419.22(e). A stormwater allocation for chromium as provided for in the federal effluent guidelines has not been included in this proposed permit. The stormwater allocations in the federal effluent guidelines apply to runoff from areas associated with industrial activity, not to outlying areas such as parking lots and surrounding acreage. Employee parking lots do, however, discharge into the stormwater flume. During the summer months of June through October the permittee may only claim the stormwater allocation after demonstrating that measurable rainfall fell at the refinery site during the previous 10 calendar days. The allocations are tabulated below.

<b>Parameters</b>	<b>Stormwater Allocation lbs/million gallons</b>		<b>Ballast Water Allocation lbs/million gallons</b>	
	<b>Monthly Average</b>	<b>Daily Maximum</b>	<b>Monthly Average</b>	<b>Daily Maximum</b>
Biochemical Oxygen Demand (5-day)	220	400	210	400
Chemical Oxygen Demand	1500	3000	2000	3900
Total Suspended Solids	180	280	170	260
Oil and Grease	67	130	67	126
Phenolic Compounds	1.4	2.9		

#### OUTFALL 002/003/004 – STORMWATER/EMERGENCY OVERFLOW EFFLUENT LIMITATIONS AND CONDITIONS

During extremely heavy rainfall events, Tesoro may discharge water from a retention pond on the west side of the refinery to prevent damage to refinery equipment and treatment facilities. The discharge points are designated Outfall 002 and Outfall 004. This wastewater would be almost entirely stormwater, but may contain small amounts of oily wastewater from drainage of the diesel loading rack pad and maintenance of the line supplying the loading rack. This pond receives no process wastewater from the refinery's process units. Under normal circumstances, Tesoro pumps this stormwater into the refinery's sewer system for processing at the wastewater treatment plant. Stormwater was discharged from this outfall in November 1990, November 1995 and December 1996. Since those incidents, Tesoro has increased the volume of this retention pond which has decreased the chances of an overflow or emergency discharge. No discharges have occurred at this outfall since December 1996.

During extremely heavy rainfall events, Tesoro may discharge water through the emergency overflow, Outfall 003, located between the East and West Polishing Ponds. The discharge would consist of high quality wastewater, treated to secondary treatment levels and would be discharged due to a heavy rain exceeding the storage capacity of either pond. Tesoro has not discharged from Outfall 003 since at least 1990.



In the event of a discharge from Outfall 002, 003, or 004, the NPDES permit requires Tesoro to characterize the quality of the effluent discharged. Parameters to be monitored include pH, BOD, TSS, COD, oil and grease, lead, zinc, volatile organics, base neutral acids (BNA'S), and phenols. These parameters were chosen based on knowledge of the characteristics of the materials handled at the truck rack, and on the constituents detected in the stormwater flume discharge, when contaminated with oily materials and are additional consistent with the types of analyses required for the final discharge to bay.

## POLLUTION PREVENTION PLANNING

### POLLUTION PREVENTION TO DATE

Tesoro submitted a Pollution Prevention Plan as required by the current NPDES permit. Projects that resulted from the plan included:

Pollution prevention activities since at least 1991 as a result of the requirements of Chapter 173-307 WAC which is aimed at reducing toxic and hazardous waste. Five year Hazardous Waste Pollution Prevention Plans with annual progress reports have been submitted since 1991. Many of the pollution prevention projects completed as a result of those requirements have had an impact at the wastewater treatment plant. Examples include: substitution of chromium based anti fouling agents with phosphate based agents and capital projects and operational changes to reduce the amount of hydrocarbons entering the process wastewater stream. Tesoro includes pollution prevention elements in its ongoing training for employees at the facility.

Although many of the pollution prevention strategies identified and implemented under Hazardous Waste Planning requirements also reduce pollutant impacts on water quality, the Permittee had not been directed to specifically review and evaluate facility processes and activities for the source reduction and control of water pollutants until the last NPDES permit cycle. The NPDES Pollution Prevention Plan as incorporated in the last permit is intended to be an ongoing process to achieve continued improvements.

### NEW REQUIREMENTS

The proposed permit requires Tesoro to update the water-oriented NPDES Pollution Prevention plan. Ecology's goals and objectives for developing and implementing pollution prevention plans are to identify, reduce, eliminate, and prevent the generation and release of pollutants to influent wastewater streams, stormwater, and/or waters of the state and to prevent violations of surface water, ground water, and sediment quality standards. The objective of this update is to identify any new sources of pollutants, to reevaluate previously identified pollution prevention opportunities and to identify any new opportunities and implement those that are technically and economically achievable.

The NPDES Pollution Prevention plan requirements include the identification and implementation of Best Management Practices (BMPs). Pursuant to 90.48 RCW and Sections 302 and 402 of the Clean Water Act, BMPs may be incorporated as permit conditions. BMPs are actions or procedures to prevent or minimize the potential for the release of pollutants or



hazardous substances in significant quantities to surface waters. BMPs, though normally qualitative, are most effective when used in conjunction with numerical effluent limits in NPDES permits.

The NPDES Pollution Prevention plan also addresses stormwater. Ecology has published guidance for the prevention of stormwater runoff contamination, entitled *Stormwater Pollution Prevention Planning for Industrial Facilities* (September 1993). The pollution prevention plan may incorporate the appropriate sections of Ecology's guidance or any other plans previously developed by the refinery, which include procedures for prevention of stormwater runoff contamination. These plans, however, will not necessarily be all inclusive of the BMPs necessary for preventing stormwater pollution by more conventional pollutants – in particular, total suspended solids. They generally do not address “clean” areas of the facility (those areas where petroleum products or hazardous materials are not stored or used). These “clean” areas may contribute conventional pollutants to the facility's stormwater.

The NPDES Pollution Prevention plan includes a review of solid waste handling and disposal procedures to prevent solid waste and solid waste leachate from causing pollution of state waters. In addition, the plan describes measures already taken to prevent the accidental release of pollutants to state waters and to minimize damages if such a spill should occur.

### *SURFACE WATER QUALITY-BASED EFFLUENT LIMITATIONS*

In order to protect existing water quality and preserve the designated beneficial uses of Washington's surface waters, WAC 173-201A-060 states that waste discharge permits shall be conditioned such that the discharge will meet established Surface Water Quality Standards. The Washington State Surface Water Quality Standards (Chapter 173-201A WAC) is a state regulation designed to protect the beneficial uses of the surface waters of the state. Surface water quality-based effluent limitations may be based on an individual waste load allocation (WLA) or on a WLA developed during a basin wide total maximum daily loading study (TMDL).

#### NUMERICAL CRITERIA FOR THE PROTECTION OF AQUATIC LIFE

"Numerical" water quality criteria are numerical values set forth in the State of Washington's Water Quality Standards for Surface Waters (Chapter 173-201A WAC). They specify the levels of pollutants allowed in a receiving water while remaining protective of aquatic life. Numerical criteria set forth in the Water Quality Standards are used along with chemical and physical data for the wastewater and receiving water to derive the effluent limits in the discharge permit. When surface water quality-based limits are more stringent or potentially more stringent than technology-based limitations, they must be used in a permit.

#### NUMERICAL CRITERIA FOR THE PROTECTION OF HUMAN HEALTH

The U.S. EPA has promulgated 91 numeric water quality criteria for the protection of human health that are applicable to Washington State (EPA 1992). These criteria are designed to protect humans from cancer and other disease and are primarily applicable to fish and shellfish consumption and drinking water from surface waters.

#### NARRATIVE CRITERIA

In addition to numerical criteria, "narrative" water quality criteria (WAC 173-201A-030) limit toxic, radioactive, or deleterious material concentrations below those which have the potential to adversely affect characteristic water uses, cause acute or chronic toxicity to biota, impair aesthetic values, or adversely affect human health. Narrative criteria protect the specific beneficial uses of all fresh (WAC 173-201A-130) and marine (WAC 173-201A-140) waters in the State of Washington.

#### ANTIDEGRADATION

The State of Washington's Antidegradation Policy requires that discharges into a receiving water shall not further degrade the existing water quality of the water body. In cases where the natural conditions of a receiving water are of lower quality than the criteria assigned, the natural conditions shall constitute the water quality criteria. Similarly, when the natural conditions of a receiving water are of higher quality than the criteria assigned, the natural conditions shall be protected. More information on the State Antidegradation Policy can be obtained by referring to WAC 173-201A-070.

#### CRITICAL CONDITIONS

Surface water quality-based limits are derived for the waterbody's critical condition, which represents the receiving water and waste discharge condition with the highest potential for adverse impact on the aquatic biota, human health, and existing or characteristic water body uses.

#### MIXING ZONES

The Water Quality Standards allow the Department of Ecology to authorize mixing zones around a point of discharge in establishing surface water quality-based effluent limits. Both "acute" and "chronic" mixing zones may be authorized for pollutants that can have a toxic effect on the aquatic environment near the point of discharge. The concentration of pollutants at the boundary of these mixing zones may not exceed the numerical criteria for that type of zone. Mixing zones can only be authorized for discharges that are receiving all known, available, and reasonable methods of prevention, control and treatment (AKART) and in accordance with other mixing zone requirements of WAC 173-201A-100.

The National Toxics Rule (EPA, 1992) allows the chronic mixing zone to be used to meet human health criteria.

#### DESCRIPTION OF THE RECEIVING WATER

The facility discharges to Fidalgo Bay which is designated as a Class A receiving water in the vicinity of the outfall. Characteristic uses include the following:

fish migration; fish and shellfish rearing, spawning and harvesting; wildlife habitat; primary contact recreation; sport fishing; boating and aesthetic enjoyment; commerce and navigation. Water quality of this class shall meet or exceed the requirements for all or substantially all uses.

Other nearby point source outfalls includes the Shell Oil Products US - Puget Sound Refining Company. The Shell wastewater treatment plant outfall is located in the vicinity of the Tesoro outfall at a Latitude of 48N 30' 34" and a Longitude of 122W 34' 37". The outfalls are physically located within 3000 feet of each other.

The closest Department of Ecology long-term core monitoring station is BLL009 in Bellingham Bay. This station is influenced by activity in Bellingham and is not suitable for a background data station. The next closest long-term core monitoring station is GRG002, located in the Georgia Strait. We used the substantial data for this station in our analysis for this permit. The closest long-term rotating station is FID001 in Fidalgo Bay. There is very limited data available for this monitoring station. A similar embayment with somewhat more extensive data is LOP001 in Lopez Sound. The quantity of data for the last two identified stations was insufficient to be used in the analysis for this permit.

#### SURFACE WATER QUALITY CRITERIA

Applicable criteria are defined in Chapter 173-201A WAC for aquatic biota. In addition, U.S. EPA has promulgated human health criteria for toxic pollutants (EPA 1992). Criteria for this discharge are summarized below:

Fecal Coliforms	14 organisms/100 mL maximum geometric mean
Dissolved Oxygen	6 mg/L minimum
Temperature	16 degrees Celsius maximum or incremental increases above background
pH	7 to 8.5 standard units
Turbidity	less than 5 NTU above background
Toxics	No toxics in toxic amounts (see Appendix C for numeric criteria for toxics of concern for this discharge)

#### CONSIDERATION OF SURFACE WATER QUALITY-BASED LIMITS FOR NUMERIC CRITERIA

Pollutant concentrations in the proposed discharge exceed water quality criteria with technology-based controls which the Department has determined to be AKART. A mixing zone is authorized in accordance with the geometric configuration, flow restriction, and other restrictions for mixing zones in Chapter 173-201A WAC.

#### Diffuser Information

Tesoro's diffuser is 26 feet long with a diameter of 30 inches. It has 3 ports, each 10 inches in diameter. The distance between ports is 11 feet. The mean lower low water (MLLW) depth at the diffuser is 25 feet. This information and additional information is available in the Dilution Ratio Study submitted to Ecology by Shell (now Tesoro) in February of 1991.

#### Chronic Mixing Zone

WAC 173-201A-100(4)(b)(i) specifies: mixing zones shall not extend in any horizontal direction from the discharge ports for a distance greater than 200 feet plus the depth of water over the

discharge ports as measured during MLLW. Given a MLLW water depth of 25 feet (7.6 meters) for Shell Oil's outfall, the horizontal distance therefore is 225 feet (68.6 meters). The mixing zone extends vertically from the seabed to the top of the water surface.

#### Acute Mixing Zone

WAC 173-201A-100(8)(b) specifies that in estuarine waters a zone where acute criteria may be exceeded shall not extend from the discharge point beyond 10% of the distance established for the maximum or chronic zone as measured independently from the discharge ports. The acute zone therefore extends 23 feet (7 meters) from the discharge ports.

The dilution factors of effluent to receiving water that occur within these zones were determined at the critical condition in the dilution and dye study entitled "Dilution Ratio Study Shell Oil Company Anacortes Refinery" prepared by CH2M Hill in February 1991. Ecology verified the information in the report in 1992. Ecology modified the original work in November 1995 to reflect current conditions. The model used for near field effects was the EPA funded dilution model UDKHDEN. Far field effects were predicted using the Brooks equation as described in the (1960) Model of Far-field Dilution of Initially Diluted Sewage Discharges From Marine Outfalls (Fischer, et al.) Ecology reevaluated the 1991 dye study and the 1995 modeling in 2003. The dilution analysis is available in Ecology's files.

Ecology has determined the dilution factors to be:

	Acute	Chronic
Aquatic Life	20	91
Human Health, Carcinogen		93
Human Health, Non-carcinogen		91

Pollutants in an effluent may affect the aquatic environment near the point of discharge (near field) or at a considerable distance from the point of discharge (far field). Toxic pollutants, for example, are near-field pollutants--their adverse effects diminish rapidly with mixing in the receiving water. Conversely, a pollutant such as BOD is a far-field pollutant whose adverse effect occurs away from the discharge even after dilution has occurred. Thus, the method of calculating surface water quality-based effluent limits varies with the point at which the pollutant has its maximum effect.

The derivation of surface water quality-based limits also takes into account the variability of the pollutant concentrations in both the effluent and the receiving water.

BOD<sub>5</sub>-- Technology-based limitations results in a discharge with a small amount of BOD loading relative to the large amount of dilution occurring in the receiving water at critical conditions. Technology-based limitations should ensure that dissolved oxygen criteria in the receiving water will meet criteria.

Fecal Coliforms --The permit requires the refinery to comply with domestic technology based effluent limits for fecal coliforms in their effluent, since domestic wastewater is treated in their wastewater facility. Domestic wastewater standards are established in Chapter 173-221 WAC, entitled "Discharge Standards and Effluent Limitations For Domestic Wastewater Facilities". Domestic effluent limits for fecal coliforms are 200 organisms/100 ml on a monthly average

basis with a maximum of 400 organisms/100 ml in any one sample. Tesoro must meet the water quality standard for marine Class A receiving waters (14 organisms/100 ml) at the edge of the chronic zone. With a dilution of 91:1 at the edge of the chronic zone the predicted fecal coliform concentration at the boundary of the chronic mixing zone is 4.3 organisms/100 ml if the maximum technical concentration standard of 400 is met and there are no fecal coliforms present in the background receiving water. Ecology calculated this concentration using a simple mass balance equation as follows:

$$[0(91) + 400(1)]/92 = 4.3.$$

The technological standard is therefore protective of the water quality standard.

Temperature—Ecology modeled the impact of the discharge on the temperature of the receiving water by simple mixing analysis at critical condition. The receiving water temperature critical condition was determined using the 90th percentile value of the temperatures recorded at the ambient monitoring station GRG002. The receiving water temperature at the critical condition is 13.3° C and the maximum summertime effluent temperature is 30° C. With a dilution of 91:1 at the edge of the chronic zone the predicted resultant temperature at the boundary of the chronic mixing zone is 13.5° C. We used a simple mass balance equation to calculate a predicted temperature as follows:  $[13.3(91) + 30(1)]/92 = 13.5$ . This temperature meets the water quality standards.

The highest recorded temperature at GRG002 (from 1988 to 2002) was 19.54°C (Sept. '98). The incremental temperature increase allowance (  $t = 12/(19.54-2)$  ) is equal to 0.68°C. With a receiving water temperature of 19.54°C and an effluent temperature of 30°C the predicted temperature at the edge of the dilution zone is equal to 19.65°C. The temperature increase of 0.11°C is less than the incremental temperature allowance and the maximum increase of 0.3°C allowed by water quality standards. The receiving water temperature at the edge of the dilution zone was calculated as follows:  $[19.54(91) + 30(1)] /92 = 19.65^{\circ}\text{C}$ .

Based on our calculations, Ecology predicts there will be no violation of Water Quality Standards for Surface Waters under critical conditions. Therefore, no effluent limitation for temperature was placed in the proposed permit.

pH--Because of the high buffering capacity of marine water, compliance with the technology-based limits of 6 to 9 will assure compliance with the Water Quality Standards for Surface Waters.

Turbidity--The impact of turbidity was evaluated based on the range of turbidity in the effluent and turbidity of the receiving water. Due to the large degree of dilution, it was determined that the turbidity criteria would not be violated outside the designated mixing zone.

Toxic Pollutants--Federal regulations (40 CFR 122.44) require NPDES permits to contain effluent limits for toxic chemicals in an effluent whenever there is a reasonable potential for those chemicals to exceed the surface water quality criteria. This process occurs concurrently with the derivation of technology-based effluent limits. Facilities with technology-based effluent

limits defined in regulation are not exempted from meeting the Water Quality Standards for Surface Waters or from having surface water quality-based effluent limits.

Tesoro's discharge contains the following toxics: cyanide, sulfide, copper, zinc, lead, silver, chloroform, dichlorobromomethane, antimony, arsenic, mercury, nickel, thallium, nitrate, phosphorus, chromium, phenol, selenium, and ammonia. Ecology conducted a reasonable potential analysis (See Appendix C) on these parameters to determine whether or not we would require effluent limitations in this permit.

The determination of the reasonable potential for cyanide, sulfide, copper, zinc, lead, silver, chloroform, dichlorobromomethane, antimony, arsenic, mercury, nickel, thallium, nitrate, phosphorus, chromium, phenol, selenium, and ammonia to exceed the water quality criteria was evaluated with procedures given in EPA, 1991 (Appendix C) at the critical condition. The parameters used in the critical condition modeling are as follows: acute dilution factor 20, chronic dilution factor 91.

Water quality criteria for metals in Chapter 173-201A WAC are based on the dissolved fraction of the metal.

The Permittee may provide data clearly demonstrating the seasonal partitioning of the dissolved metal in the ambient water in relation to an effluent discharge. Metals criteria may be adjusted on a site-specific basis when data is available clearly demonstrating the seasonal partitioning in the ambient water in relation to an effluent discharge.

Metals criteria may also be adjusted using the water effects ratio approach established by USEPA, as generally guided by the procedures in USEPA Water Quality Standards Handbook, December 1983, as supplemented or replaced.

Valid ambient background data was available for copper, zinc, lead, silver, arsenic, mercury, nickel, chromium, selenium. Calculations using all applicable data resulted in a determination that there is no reasonable potential for this discharge to cause a violation of water quality standards. This determination assumes that the Permittee meets the other effluent limits of this permit.

#### Ammonia

Ecology evaluated ammonia's reasonable potential to exceed water quality standards. Determining the site specific acute and chronic criteria for ammonia is more complicated than simply obtaining the criteria from the regulations and comparing to the effluent data. Ammonia's toxicity depends on that portion which is available in the unionized form. The amount of unionized ammonia depends on the pH, dissolved oxygen, and salinity of the receiving water in the marine environment. To evaluate ammonia toxicity, we therefore needed receiving water information.

Ecology evaluated Georgia Strait ambient receiving water data (station GRG 002) to determine the site specific acute and chronic criteria and to obtain background ammonia data. GRG002, located in the Georgia Strait, is a long term core station for which substantial data exists. We calculated the acute and chronic ammonia criteria using Hampson's model in a spreadsheet form.



From those criteria, we chose the 90th percentile value to represent the critical condition as recommended by the Ecology Permit Writer's Manual. We used the value for the ambient station and the 90th percentile value for background total ammonia concentration in the reasonable potential calculation as shown in Appendix C.

When a large quantity of data is available, Ecology generally uses the 95<sup>th</sup> percentile value to determine reasonable potential for a parameter to violate water quality standards. Effluent ammonia is measured each day at the Tesoro refinery and Ecology used this data as part of the evaluation. To expedite the analysis because of the large volume of data available, we used the maximum ammonia value which results in a more conservative analysis.

Based on the data, calculations and analyses described above, and given the dilution available at Tesoro, Ecology determined that there is no reasonable potential for ammonia in the effluent to result in water quality standards violations at the edge of the dilution zone. To violate water quality standards the effluent concentration would have to be greater than 52 mg/l. The maximum level found in the available data for 1999 - 2003 was 5 mg/l. An average concentration of 18 mg/l of ammonia a day for any month would be a violation of the technology based standards (450 lbs/day for monthly avg.) for the Tesoro refinery (assuming 3 MGD, approx avg.) With the available dilution at Tesoro the technology based effluent limit for ammonia is sufficiently protective of water quality standards.

### **Whole Effluent Toxicity**

The Water Quality Standards for Surface Waters require that the effluent not cause toxic effects in the receiving waters. Many toxic pollutants cannot be detected by commonly available detection methods. However, toxicity can be measured directly by exposing living organisms to the wastewater in laboratory tests and measuring the response of the organisms. Toxicity tests measure the aggregate toxicity of the whole effluent, and therefore this approach is called whole effluent toxicity (WET) testing. Some WET tests measure acute toxicity and other WET tests measure chronic toxicity.

Acute toxicity tests measure mortality as the significant response to the toxicity of the effluent. Dischargers who monitor their wastewater with acute toxicity tests are providing an indication of the potential lethal effect of the effluent to organisms in the receiving environment.

Chronic toxicity tests measure various sublethal toxic responses such as retarded growth or reduced reproduction. Chronic toxicity tests often involve either a complete life cycle test of an organism with an extremely short life cycle or a partial life cycle test on a critical stage of one of a test organism's life cycles. Organism survival is also measured in some chronic toxicity tests.

Accredited WET testing laboratories have the proper WET testing protocols, data requirements, and reporting format. Accredited laboratories are knowledgeable about WET testing and capable of calculating an NOEC, LC<sub>50</sub>, EC<sub>50</sub>, IC<sub>25</sub>, etc. All accredited labs have been provided the most recent version of the Department of Ecology Publication # WQ-R-95-80, Laboratory Guidance and Whole Effluent Toxicity Test Review Criteria which is referenced in the permit. Any Permittee interested in receiving a copy of this publication may call the Ecology Publications

Distribution Center 360-407-7472 for a copy or visit online

<http://www.ecy.wa.gov/programs/wq/wet>. Ecology recommends that Permittees send a copy of the acute or chronic toxicity sections(s) of their permits to their laboratory of choice.

The WET tests during effluent characterization indicate that no reasonable potential exists to cause receiving water acute or chronic toxicity, and the Permittee will not be given an acute or chronic WET limit and will only be required to retest the effluent prior to application for permit renewal in order to demonstrate that acute and chronic toxicity has not increased in the effluent.

If the Permittee makes process or material changes which, in the Department's opinion, results in an increased potential for effluent toxicity, then the Department may require additional effluent characterization in a regulatory order, by permit modification, or in the permit renewal. Toxicity is assumed to have increased if WET testing conducted for submission with a permit application fails to meet the performance standards in WAC 173-205-020, "whole effluent toxicity performance standard". The Permittee may demonstrate to the Department that changes have not increased effluent toxicity by performing additional WET testing after the time the process or material changes have been made.

In cooperation with the Cherry Point refineries, Ecology has developed WET tests using herring indigenous to Puget Sound. These tests include: a chronic test (embryo survival and development), an acute test (larval survival) and a chronic test (larval growth). These tests are now available for regulatory use. Ecology requires Tesoro to use these tests in the permit. These herring tests are not at this time included in WAC 173-205-050(1)(d) and cannot be used to determine the need for toxicity limits or for monitoring compliance.

#### HUMAN HEALTH

Washington's water quality standards now include 91 numeric health-based criteria that must be considered in NPDES permits. These criteria were promulgated for the state by the U.S. EPA in its National Toxics Rule (Federal Register, Volume 57, No. 246, Tuesday, December 22, 1992).

The Department has determined that the effluent is likely to have chemicals of concern for human health. The discharger's high priority status is based on the discharger's status as a major discharger and knowledge of data or process information indicating regulated chemicals occur in the discharge.

Samples were taken for the 91 listed Human Health criteria pollutants. These occurred in four separate events over four years. Of the 91 parameters, 9 were detected in the effluent.

A determination of the discharge's potential to cause an exceedance of the water quality standards for Human Health was conducted as required by 40 CFR 122.44(d). The reasonable potential determination was evaluated with procedures given in the Technical Support Document for Water Quality-Based Toxics Control (EPA/505/2-90-001) and the Department's Permit Writer's Manual (Ecology Publication 92-109, July, 1994). The determination indicated that the discharge has no reasonable potential to cause a violation of water quality standards, thus an effluent limit is not warranted.

In 1992 the USEPA adopted risk-based arsenic criteria for the protection of human health for the State of Washington. The criterion for marine waters is 0.14 µg/L inorganic arsenic, and is



based on exposure from fish and shellfish tissue ingestion. The freshwater criterion is 0.018 µg/L, and is based on exposure from fish and shellfish tissue and water ingestion. These criteria have caused confusion in implementation because they differ from the drinking water maximum contaminant level (MCL) of 10 µg/L, which is not risk-based, and because the human health criteria are sometimes exceeded by natural background concentrations of arsenic in surface water and ground water.

In Washington, when a natural background concentration exceeds the criterion, the natural background concentration becomes the criterion, and no dilution zone is allowed. This could result in a situation where natural groundwater or surface water used as a municipal or industrial source-water would need additional treatment to meet numeric effluent limits even though no arsenic was added as waste. Although this is not the case for all dischargers, we do not have data at this time to quantify the extent of the problem.

A regulatory mechanism to deal with the issues associated with natural background concentrations of arsenic in groundwater-derived drinking waters is currently lacking. Consequently, the Water Quality Program, at this time, has decided to use a three-pronged strategy to address the issues associated with the arsenic criteria. The three strategy elements are:

**1. Pursue, at the national level, a solution to the regulatory issue of groundwater sources with high arsenic concentrations causing municipal treatment plant effluent to exceed criteria.** The revision of the MCL for arsenic offered a national opportunity to discuss how drinking water sources can affect NPDES wastewater dischargers, however Ecology was unsuccessful in focusing the discussion on developing a national policy for arsenic regulation that acknowledges the risks and costs associated with management of the public exposure to natural background concentrations of arsenic through water sources. The current arsenic MCL of 10 µg/L could also result in municipal treatment plants being unable to meet criteria-based effluent limits. Ecology will continue to pursue this issue as opportunities arise.

**2. Additional and more focussed data collection.** The Water Quality Program will in some cases require additional and more focussed arsenic data collection, will encourage or require dischargers to test for source water arsenic concentrations, and will pursue development of a proposal to have Ecology's Environmental Assessment Program conduct drinking water source monitoring as well as some additional ambient monitoring data. At this time, Washington NPDES permits will contain numeric effluent limits for arsenic based only on treatment technology and aquatic life protection as appropriate.

**3. Data sharing.** Ecology will share data with USEPA as they work to develop new risk-based criteria for arsenic and as they develop a strategy to regulate arsenic.

Ecology must evaluate whether or not the discharge has reasonable potential to violate human health criteria at the edge of the chronic zone. To more thoroughly evaluate human health criteria the permit requires Tesoro to recharacterize the effluent by sampling for the 91 human health criteria listed pollutants (priority pollutants), excluding PCB's, PBB's, asbestos, and all pesticides except any listed pesticide that is used on the refinery site. In addition to the human

health criteria, Tesoro shall analyze the final effluent for dibenzofuran, using EPA Method 8270 or its equivalent. The effluent shall be sampled and analyzed annually during the life of the permit. At least two of these sampling events shall coincide with the discharge of pollutants from the catalytic reformer regeneration process.

#### SEDIMENT QUALITY

The Department has promulgated aquatic sediment standards (Chapter 173-204 WAC) to protect aquatic biota and human health. These standards state that the Department may require Permittees to evaluate the potential for the discharge to cause a violation of applicable standards (WAC 173-204-400).

Review of previous sediment surveys in 1995 and 2001, by Ecology's sediment management unit, shows no violation of sediment standards. There has been a concern that more study of possible ammonia impacts may be needed in the future.

The Department has determined through this review, and of the discharger characteristics, sediment samples, and effluent characteristics that this discharge has no reasonable potential to violate the Sediment Management Standards. We will reevaluate Tesoro's potential to violate sediment standards at the next permit cycle.

#### GROUND WATER QUALITY LIMITATIONS

The Department has promulgated Ground Water Quality Standards (Chapter 173-200 WAC) to protect beneficial uses of ground water. Permits issued by the Department shall be conditioned in such a manner so as not to allow violations of those standards (WAC 173-200-100).

Tesoro has two unlined final wastewater polishing ponds that could potentially discharge to groundwater. These ponds are located within approximately 200 feet of Fidalgo Bay at high tide. If a discharge to ground water from these ponds is occurring, it discharges almost directly into the Bay, where the final effluent is currently discharged via a marine outfall. The discharge would consist of high quality wastewater, treated to secondary treatment levels. Concentrations of most pollutants in Tesoro's effluent were found to be less than the groundwater quality criteria. Only three metals, mercury, selenium, and arsenic, and the organic compound chloroform exceeded the criteria. Chloroform and arsenic were the only parameters present at levels that were significantly higher than the criteria. Incidental leakage of effluent of this quality, and in this location, should have undetectable or minimal impacts to ground water quality. The volume of groundwater, which would potentially be impacted, would be very small; and impacts would occur just prior to its entering the marine receiving water (the current discharge location). Therefore no limitations or actions are required based on potential effects to ground water.

#### **Dangerous Wastes – Permit By Rule Requirements**

The permit authorizes Tesoro to treat dangerous wastes whether generated on or off-site at the wastewater treatment facility, under the permit by rule provisions of WAC 173-303-802(5). This

authorization is limited to the on-site and off-site waste streams identified and characterized on the permit application and application amendments approved by Ecology. Offsite wastes include ballast water and retail distribution water. Ecology reviewed the offsite waste streams identified and has determined that they are similar in nature to those generated on-site and concludes that they should be treated effectively at Tesoro's wastewater treatment facility. Established effluent sampling and monitoring should be adequate to address the pollutants in these wastestreams. Permit by rule provisions cover the identified waste streams as long as the permittee complies with the conditions of the permit, and complies with the dangerous waste requirements pertaining to: notification and identification numbers, designation of dangerous wastes, performance standards, general waste analysis, security, contingency plans and emergency procedures, emergencies, the manifest system, the operating record and facility reporting.

## **MONITORING REQUIREMENTS**

Monitoring, recording, and reporting are required (WAC 173-220-210 and 40 CFR 122.41) to verify that the treatment process is functioning correctly and the effluent limitations are being achieved.

The monitoring schedule is detailed in the proposed permit under Condition S.2. Specified monitoring frequencies take into account the quantity and variability of the discharge, the treatment method, Tesoro's past compliance, significance of pollutants, and the cost of monitoring. Ecology has determined that the TSS and Oil/Grease frequency will be at minimum 5/wk; these are indicator parameters for refining facilities and serve to demonstrate ongoing system performance.

### *EFFLUENT LIMITS BELOW QUANTITATION*

The Quantitation Level is the level at which concentrations can be reliably reported with a specified level of error. For maximum daily effluent limits, if the measured effluent concentration is below the Quantitation Level, the Permittee reports NQ for non-quantifiable. For average monthly effluent limits, all effluent concentrations below the Quantitation Level but above the Method Detection Level are used as reported for calculating the average monthly value.

### *EFFLUENT LIMITS BELOW DETECTION*

The Method Detection Level (MDL) is the minimum concentration of an analyte that can be measured and reported with a 99 percent confidence that it's concentration is greater than zero as determined by a specific laboratory method. For maximum daily limits, if the concentrations are below the MDL the Permittee reports ND for non-detectable. For average monthly limits, all values above the MDL are used as reported and all values below the MDL are calculated as zero.

### *LAB ACCREDITATION*

With the exception of certain parameters the permit requires all monitoring data to be prepared by a laboratory registered or accredited under the provisions of Chapter 173-50 WAC, *Accreditation of Environmental Laboratories*.

## **OTHER PERMIT CONDITIONS**

### *REPORTING AND RECORDKEEPING*

The conditions of S3. are based on the authority to specify any appropriate reporting and recordkeeping requirements to prevent and control waste discharges (WAC 173-220-210).

### *NON-ROUTINE AND UNANTICIPATED DISCHARGES*

Occasionally, this facility may generate wastewater which is not characterized in their permit application because it is not a routine discharge and was not anticipated at the time of application. These typically are waters used to pressure test storage tanks or fire water systems or leaks from drinking water systems. These are typically clean waste waters but may be contaminated with pollutants. The permit contains an authorization for non-routine and unanticipated discharges. The permit requires a characterization of these waste waters for pollutants and examination of the opportunities for reuse. Depending on the nature and extent of pollutants in this wastewater and opportunities for reuse, Ecology may authorize a direct discharge via the process wastewater outfall or through a stormwater outfall for clean water, require the wastewater to be placed through the facilities wastewater treatment process or require the water to be reused.

### *OUTFALL EVALUATION*

The facility submitted an outfall inspection report in 2002, indicating no problems with the outfall.

Proposed permit condition S12. requires the Permittee to conduct an outfall inspection and submit a report detailing the findings of that inspection. The purpose of the inspection is to determine the condition of the discharge pipe and diffusers and to evaluate the extent of sediment accumulations in the vicinity of the outfall.

### *TREATMENT SYSTEM OPERATING PLAN (TSOP)*

During the previous permit term, on October 30, 1998, Tesoro submitted a TSOP to Ecology. Updates to this plan will be required in the proposed permit.

In accordance with state and federal regulations, the Permittee is required to take all reasonable steps to properly operate and maintain the treatment system (40 CFR 122.41(e)) and WAC 173-220-150 (1)(g). An operation and maintenance manual was submitted as required by state regulation for the construction of wastewater treatment facilities (WAC 173-240-150). It has been determined that the implementation of the procedures in the Treatment System Operating Plan is a reasonable measure to ensure compliance with the terms and limitations in the permit.

### *GENERAL CONDITIONS*

General Conditions are based directly on state and federal law and regulations and have been standardized for all individual industrial NPDES permits issued by the Department.

### **PERMIT ISSUANCE PROCEDURES**

#### *PERMIT MODIFICATIONS*

The Department may modify this permit to impose numerical limitations, if necessary to meet Water Quality Standards for Surface Waters, Sediment Quality Standards, or Water Quality Standards for Ground Waters, based on new information obtained from sources such as inspections, effluent monitoring, outfall studies, and effluent mixing studies.

The Department may also modify this permit as a result of new or amended state or federal regulations.

#### *RECOMMENDATION FOR PERMIT ISSUANCE*

This proposed permit meets all statutory requirements for authorizing a wastewater discharge, including those limitations and conditions believed necessary to control toxics, protect human health, aquatic life, and the beneficial uses of waters of the State of Washington. The Department proposes that this proposed permit be issued for 5 years.

### **REFERENCES FOR TEXT AND APPENDICES**

Environmental Protection Agency (EPA)

1992. National Toxics Rule. Federal Register, V. 57, No. 246, Tuesday, December 22, 1992.

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## **APPENDIX A--PUBLIC INVOLVEMENT INFORMATION**

The Department has tentatively determined to reissue a permit to the applicant listed on page 1 of this fact sheet. The permit contains conditions and effluent limitations which are described in the rest of this fact sheet.

Public notice of application was published on (date) and (date) in (name of publication) to inform the public that an application had been submitted and to invite comment on the reissuance of this permit.

The Department will publish a Public Notice of Draft (PNOD) on (date) in (name of publication) to inform the public that a draft permit and fact sheet are available for review. Interested persons are invited to submit written comments regarding the draft permit. The draft permit, fact sheet, and related documents are available for inspection and copying between the hours of 8:00 a.m. and 5:00 p.m. weekdays, by appointment, at the regional office listed below. Written comments should be mailed to:

Water Quality Permit Coordinator  
Department of Ecology  
Industrial Section  
PO Box 47706  
Olympia, Washington 98504.

Any interested party may comment on the draft permit or request a public hearing on this draft permit within the thirty (30) day comment period to the address above. The request for a hearing shall indicate the interest of the party and reasons why the hearing is warranted. The Department will hold a hearing if it determines there is a significant public interest in the draft permit (WAC 173-220-090). Public notice regarding any hearing will be circulated at least thirty (30) days in advance of the hearing. People expressing an interest in this permit will be mailed an individual notice of hearing (WAC 173-220-100).

Comments should reference specific text followed by proposed modification or concern when possible. Comments may address technical issues, accuracy and completeness of information, the scope of the facility's proposed coverage, adequacy of environmental protection, permit conditions, or any other concern that would result from issuance of this permit.

The Department will consider all comments received within thirty (30) days from the date of public notice of draft indicated above, in formulating a final determination to issue, revise, or deny the permit. The Department's response to all significant comments is available upon request and will be mailed directly to people expressing an interest in this permit.

Further information may be obtained from the Department by writing to the address listed above.

This permit and fact sheet were written by J. Mark Dirkx, P.E. and Nancy Kmet, P.E.



## **APPENDIX B--GLOSSARY**

**Acute Toxicity**--The lethal effect of a compound on an organism that occurs in a short period of time, usually 48 to 96 hours.

**AKART**-- An acronym for “all known, available, and reasonable methods of treatment”.

**Ambient Water Quality**--The existing environmental condition of the water in a receiving water body.

**Ammonia**--Ammonia is produced by the breakdown of nitrogenous materials in wastewater. Ammonia is toxic to aquatic organisms, exerts an oxygen demand, and contributes to eutrophication. It also increases the amount of chlorine needed to disinfect wastewater.

**Average Monthly Discharge Limitation** --The average of the measured values obtained over a calendar month's time.

**Best Management Practices (BMPs)**--Schedules of activities, prohibitions of practices, maintenance procedures, and other physical, structural and/or managerial practices to prevent or reduce the pollution of waters of the State. BMPs include treatment systems, operating procedures, and practices to control: plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage. BMPs may be further categorized as operational, source control, erosion and sediment control, and treatment BMPs.

**BOD<sub>5</sub>**--Determining the Biochemical Oxygen Demand of an effluent is an indirect way of measuring the quantity of organic material present in an effluent that is utilized by bacteria. The BOD<sub>5</sub> is used in modeling to measure the reduction of dissolved oxygen in a receiving water after effluent is discharged. Stress caused by reduced dissolved oxygen levels makes organisms less competitive and less able to sustain their species in the aquatic environment. Although BOD is not a specific compound, it is defined as a conventional pollutant under the federal Clean Water Act.

**Bypass**--The intentional diversion of waste streams from any portion of a treatment facility.

**Chlorine**--Chlorine is used to disinfect wastewaters of pathogens harmful to human health. It is also extremely toxic to aquatic life.

**Chronic Toxicity**--The effect of a compound on an organism over a relatively long time, often 1/10 of an organism's lifespan or more. Chronic toxicity can measure survival, reproduction or growth rates, or other parameters to measure the toxic effects of a compound or combination of compounds.

**Clean Water Act (CWA)**--The Federal Water Pollution Control Act enacted by Public Law 92-500, as amended by Public Laws 95-217, 95-576, 96-483, 97-117; USC 1251 et seq.

**Compliance Inspection - Without Sampling**--A site visit for the purpose of determining the compliance of a facility with the terms and conditions of its permit or with applicable statutes and regulations.



**Compliance Inspection - With Sampling**--A site visit to accomplish the purpose of a Compliance Inspection - Without Sampling and as a minimum, sampling and analysis for all parameters with limits in the permit to ascertain compliance with those limits; and, for municipal facilities, sampling of influent to ascertain compliance with the 85 percent removal requirement. Additional sampling may be conducted.

**Composite Sample**--A mixture of grab samples collected at the same sampling point at different times, formed either by continuous sampling or by mixing discrete samples. May be "time-composite"(collected at constant time intervals) or "flow-proportional" (collected either as a constant sample volume at time intervals proportional to stream flow, or collected by increasing the volume of each aliquot as the flow increased while maintaining a constant time interval between the aliquots.

**Construction Activity**--Clearing, grading, excavation and any other activity which disturbs the surface of the land. Such activities may include road building, construction of residential houses, office buildings, or industrial buildings, and demolition activity.

**Continuous Monitoring** --Uninterrupted, unless otherwise noted in the permit.

**Critical Condition**--The time during which the combination of receiving water and waste discharge conditions have the highest potential for causing toxicity in the receiving water environment. This situation usually occurs when the flow within a water body is low, thus, its ability to dilute effluent is reduced.

**Dilution Factor**--A measure of the amount of mixing of effluent and receiving water that occurs at the boundary of the mixing zone. Expressed as the inverse of the percent effluent fraction e.g., a dilution factor of 10 means the effluent comprises 10% by volume and the receiving water 90%.

**Engineering Report**--A document which thoroughly examines the engineering and administrative aspects of a particular domestic or industrial wastewater facility. The report shall contain the appropriate information required in WAC 173-240-060 or 173-240-130.

**Fecal Coliform Bacteria**--Fecal coliform bacteria are used as indicators of pathogenic bacteria in the effluent that are harmful to humans. Pathogenic bacteria in wastewater discharges are controlled by disinfecting the wastewater. The presence of high numbers of fecal coliform bacteria in a water body can indicate the recent release of untreated wastewater and/or the presence of animal feces.

**Grab Sample**--A single sample or measurement taken at a specific time or over a short period of time as is feasible.

**Industrial Wastewater**--Water or liquid-carried waste from industrial or commercial processes, as distinct from domestic wastewater. These wastes may result from any process or activity of industry, manufacture, trade or business, from the development of any natural resource, or from animal operations such as feed lots, poultry houses, or dairies. The term includes contaminated storm water and, also, leachate from solid waste facilities.

**Major Facility**--A facility discharging to surface water with an EPA rating score of > 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

**Maximum Daily Discharge Limitation**--The highest allowable daily discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. The daily discharge is calculated as the average measurement of the pollutant over the day.

**Method Detection Level (MDL)**--The minimum concentration of a substance that can be measured and reported with 99% confidence that the analyte concentration is above zero and is determined from analysis of a sample in a given matrix containing the analyte.

**Minor Facility**--A facility discharging to surface water with an EPA rating score of < 80 points based on such factors as flow volume, toxic pollutant potential, and public health impact.

**Mixing Zone**--An area that surrounds an effluent discharge within which water quality criteria may be exceeded. The area of the authorized mixing zone is specified in a facility's permit and follows procedures outlined in state regulations (Chapter 173-201A WAC).

**National Pollutant Discharge Elimination System (NPDES)**--The NPDES (Section 402 of the Clean Water Act) is the Federal wastewater permitting system for discharges to navigable waters of the United States. Many states, including the State of Washington, have been delegated the authority to issue these permits. NPDES permits issued by Washington State permit writers are joint NPDES/State permits issued under both State and Federal laws.

**pH**--The pH of a liquid measures its acidity or alkalinity. A pH of 7 is defined as neutral, and large variations above or below this value are considered harmful to most aquatic life.

**Quantitation Level (QL)**-- A calculated value five times the MDL (method detection level).

**Responsible Corporate Officer**-- A president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy- or decision-making functions for the corporation, or the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or have gross annual sales or expenditures exceeding \$25 million (in second quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures (40 CFR 122.22).

**Technology-based Effluent Limit**--A permit limit that is based on the ability of a treatment method to reduce the pollutant.

**Total Suspended Solids (TSS)**--Total suspended solids is the particulate material in an effluent. Large quantities of TSS discharged to a receiving water may result in solids accumulation. Apart from any toxic effects attributable to substances leached out by water, suspended solids may kill fish, shellfish, and other aquatic organisms by causing abrasive injuries and by clogging the gills and respiratory passages of various aquatic fauna. Indirectly, suspended solids can screen out light and can promote and maintain the development of noxious conditions through oxygen depletion.

**State Waters**--Lakes, rivers, ponds, streams, inland waters, underground waters, salt waters, and all other surface waters and watercourses within the jurisdiction of the state of Washington.

**Stormwater**--That portion of precipitation that does not naturally percolate into the ground or evaporate, but flows via overland flow, interflow, pipes, and other features of a storm water drainage system into a defined surface water body, or a constructed infiltration facility.

**Upset**--An exceptional incident in which there is unintentional and temporary noncompliance with technology-based permit effluent limitations because of factors beyond the reasonable control of the Permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, lack of preventative maintenance, or careless or improper operation.

**Water Quality-based Effluent Limit**--A limit on the concentration of an effluent parameter that is intended to prevent the concentration of that parameter from exceeding its water quality criterion after it is discharged into a receiving water.

## **APPENDIX C--TECHNICAL CALCULATIONS**

Several of the Excel® spreadsheet tools used to evaluate a discharger's ability to meet Washington State water quality standards can be found on the Department's homepage at <http://www.ecy.wa.gov>.

**APPENDIX D--RESPONSE TO COMMENTS**

**APPENDIX F--SIZE AND PROCESS FACTOR CALCULATIONS**